



UNEP



**United Nations  
Environment Programme**

**Food and Agriculture Organization  
of the United Nations**

Distr.: General  
11 January 2005

English only

**Rotterdam Convention on the Prior Informed  
Consent Procedure for Certain Hazardous  
Chemicals and Pesticides in International Trade  
Chemical Review Committee**

First meeting

Geneva, 11–18 February 2005

Item 7 (m) of the provisional agenda\*

**Inclusion of chemicals in Annex III of the Rotterdam Convention:  
Review of notifications of final regulatory actions to ban  
or severely restrict a chemical: chrysotile asbestos**

## **Chrysotile asbestos**

### **Note by the secretariat**

The secretariat has the honour to provide, in the annex to the present note, the supporting documentation received from Australia in support of its notification of final regulatory action on chrysotile asbestos. A focused summary is attached in annex I to the note and a list of supporting documentation, including the web addresses of the documents, in annex II.

---

\* UNEP/FAO/RC/CRC.1/1.

## Annex I

### Australia's focused summary relating to its notification of final regulatory action on chrysotile asbestos

#### I. Introduction

##### (a) The events that led to the final regulatory action

Use of chrysotile asbestos has been severely restricted in Australia since 31 December 2003. The National Industrial Chemicals Notification and Assessment Scheme (NICNAS) conducted a review of chrysotile in 1995 and published the final report in February 1999. The Chrysotile Priority Existing Chemical (PEC) assessment included information on chemical and physical properties, uses, exposure, kinetics and metabolism, effects on experimental animals and in vitro test systems, and human health effects. It also includes a hazard assessment and classification, risk characterisation and management, and recommendations for safe use. The report is available on the NICNAS web site at: <http://www.nicnas.gov.au/publications/CAR/PEC/PEC9/PEC9index.asp>

##### (b) Significance of regulatory action, e.g. one use or many uses, level or degree of exposure

As a result of the recommendations made by NICNAS in its report on chrysotile the Australian National Occupational Health and Safety Commission (NOHSC) in March 2001, proposed a severe restriction on all forms of asbestos and specifically on chrysotile asbestos for all uses apart from certain specific time-limited exemptions. These restrictions came into effect on 31 December 2003. Since 1995, the use of chrysotile had been prohibited when used for manufacture of asbestos products.

##### (c) An overview of the regulatory system of the notifying country if relevant

Chemical regulation in Australia occurs through several governmental agencies at both the Commonwealth and State level. Generally, whilst the assessment and registration of chemicals occurs at the Commonwealth level, management of chemicals occurs at the State level. Thus, control of usage and sales is primarily the responsibility of the States and Territories. State and Territory legislation directed at improving the management of chemicals across their lifecycles complement the activities of each of the Commonwealth schemes. Each State has a system of chemicals management designed to control a chemical throughout its lifecycle. Fields covered by specific State and Territory legislation include occupational health and safety, environment protection, transport and waste.

NICNAS is the Australian Government regulator for industrial chemicals and is located in the Office of Chemical Safety, within the Health and Ageing portfolio. NICNAS assesses all industrial chemicals new to Australia and assesses those industrial chemicals already used (existing chemicals) on a priority basis, in response to concerns about their safety on health and environmental grounds. A 'weight of evidence' approach is adopted in the assessment of each chemical, taking into account all available information including published literature, unpublished data, public information and international assessments. Recommendations from the NICNAS PEC assessment reports can have an important bearing on regulatory action that may be implemented within Australia in the context of protecting the health of workers and the public, and protecting the environment. For instance, they may impact on national occupational exposure standards, hazard classification, health surveillance guidelines, labelling requirements, and the development of codes of practice.

The National Occupational Health and Safety Commission (NOHSC) is Australia's national body that leads and coordinates national efforts to prevent workplace death, injury and disease in Australia. NOHSC recommends various standards and guidelines which the States and Territories take up and incorporate into their laws.

##### (d) Scope of the regulatory action – precise description of the chemicals subject to the regulatory action

The prohibition of chrysotile, from 31 December 2003, was made via amendments to the Australian Customs Services laws declaring the various forms of asbestos as prohibited imports (subject to exemptions). No asbestos is mined now in Australia and no new mining activity would be allowed as

the total ban relates to the use, export and import of asbestos in Australia. The forms of asbestos listed in table 1 are now banned from import by federal legislation and from use in workplaces by state/territory laws (subject to the exemptions).

Table 1: Forms of asbestos prohibited in Australia

Name	CAS Number	Synonym
Actinolite asbestos	77536-66-4	
Amosite	12172-73-5	Brown asbestos
Anthophyllite asbestos	77536-67-5	
Chrysotile	12001-29-5	White asbestos
Crocidolite	12001-28-4	Blue asbestos
Tremolite asbestos	77536-68-6	

Uses of chrysotile asbestos in Australia have now been banned as a result of the regulatory action except for certain limited exemptions. These exemptions are:

- Compressed asbestos fibre gaskets for use with saturated steam, superheated steam, or with substances, which are classified as dangerous goods, incl. corrosive or flammable, and very toxic or toxic. Where compressed asbestos fibre gaskets are to be used with chlorine, the exemption applies for plants used in liquid chlorine service with design process conditions of – 45 degrees Celsius and 1500 kPa pressure. Exemption until 31 December 2004 and, for use with chlorine, 31 December 2006.
- Any product consisting of a mixture of asbestos with a phenol formaldehyde resin or with a cresylic formaldehyde resin used in: vanes for rotary vacuum pumps; vanes for rotary compressors; or split face seals of at least 150 millimetres in diameter used to prevent leakage of water from cooling water pumps in fossil fuel electricity generating stations. Exemption until 31 December 2007.
- Diaphragms for use in electrolytic cells in existing electrolysis plants for chlor-alkali manufacture. Exemption until 31 December 2006.
- For the Australian Defence Organisation to use chrysotile parts and components which the ADO considers to be mission-critical, and where there is no known suitable, non-chrysotile alternative. This exemption will be regulated in detail by the Safety Rehabilitation Compensation Commission. Exemption until 31 December 2007.

It is not known whether products in these exempted categories are currently used in Australia.

## II. Risk evaluation

### (a) Key findings of the national risk evaluation

Australia's risk assessment report focused on: the occupational, public health and environmental risks associated with current uses and applications of chrysotile in Australia. In particular, the assessment has focused on the importation of chrysotile for manufacture of friction products and gaskets together with the use of these products in a variety of 'down stream' industrial/occupational sectors. Also assessed was the use of chrysotile as an additive in a specialty epoxy resin adhesive.

This report was based on reports available in the scientific literature, reviews by overseas agencies (such as IARC), together with local exposure and use data provided by Australian industry. It covers occupational health and safety, public health considerations and the effect of the chemical on the environment, undertakes a hazard and risk assessment of chrysotile over those three areas and makes recommendations based on the risk evaluation.

The assessment found that in Australia, the mining of asbestos (all forms) ceased in 1983. Asbestos (all forms) has not been exported from Australia since 1984. Chrysotile is the only form of raw asbestos being imported into Australia (by 3 companies) and remained at approximately 1000-2000 tonnes per

year from 1990 to 1999, Canada being the sole source of these imports. Imports of asbestos (assumed to be mainly chrysotile) products, particularly friction products and gaskets, do not appear to be declining. Asbestos is still present in the general Australian community from a range of past uses, which have been carried out for substantial periods of time. In Australia imports of raw chrysotile were used mainly in the manufacture of friction materials and compressed asbestos fibre (CAF) sheeting for gasket production with a small quantity being used in the manufacture of a 'non-sag' additive in an epoxy resin adhesive. All these uses, according to manufacturers, were being phased out. Brake linings and gaskets were found to be the main asbestos products imported for use in Australia, although most such products imported into Australia are asbestos-free.

(b) **Summary of actual (or potential) human exposure and/or environmental fate**

**Human exposure assessment**

Chrysotile can cause asbestosis, lung cancer and mesothelioma in humans and animals in a dose related manner. The Australia Mesothelioma Program reports that Australia has the highest incidence of mesothelioma in the world. The potency of chrysotile in relation to other forms of asbestos (crocidolite, amosite and tremolite) and whether asbestosis is a prerequisite for cancer is contentious, and hence, whether a level of exposure for chrysotile exists, below which there would be no risk to human health (i.e., an exposure threshold for carcinogenic effects). Linear extrapolation methodology was used to provide a conservative estimate of risk. Risk estimates for lung cancer in workers appear to be dependent on both cumulative exposure and the type of industry where exposure has occurred. NOHSC (NOHSC, 1995a) has estimated the lifetime risk of lung cancer, based on the best available epidemiological data (from friction products industries overseas) as up to 173 additional cancers per 100,000 workers exposed to a daily average of 1 chrysotile fibre per mL. Extrapolation for lower exposures provides lifetime risk estimates (per 100,000 population) of 86 and 17 for exposure to 0.5 and 0.1 f/mL, respectively, although estimates by US NIOSH and OSHA are between 4 and 30 times higher (Lash, 1997; Stayner et al 1997). There are many confounding factors surrounding risk estimates for chrysotile exposure, the most important of which are; the possibility of a threshold effect, possible co-exposure to other fibre types, inaccurate estimates of historical exposures and the influence of tobacco smoking.

**Workers:** Exposures of most concern are those where friable chrysotile may be generated. Occupational exposure may arise from the manufacture of CAF sheeting and other products (mainly friction products) and during processing and end-use (replacement) of these products, where public exposure may also occur. The major route of exposure is inhalation. Air monitoring data were provided by two producers of chrysotile products. Data for the period 1992 to 1997, indicated that more than 80% of personal samples were less than 0.1 f/mL. Only 2 samples during this period exceeded 0.5 f/mL. Monitoring data (1991-96) at the second site where raw chrysotile is handled, indicated that approximately 60% of the personal air samples were less than 0.1 f/mL, with only one sample exceeding 0.5 f/mL. Personal and static samples for the years 1989, 1991, 1993 and 1995 at another site, where production of gaskets takes place were all less than 0.05 f/mL (static exposures below 0.01 f/mL). Air monitoring data from other sources were also assessed, which included an automotive aftermarket survey of service garages in Western Australia where exposure levels were found to be less than 0.1 f/mL. The NICNAS Automotive Aftermarket Survey showed that exposure to friable asbestos is highest in the brake bonding industry during grinding of brake shoes and cutting of brake linings. The highest personal monitoring result obtained was 0.16 f/mL, during machining of brake shoes. Work in the brake bonding industry is declining due to the availability of brake pad and clutch kits (preformed to standard sizes) which do not require modification before installation. However it was reported that 90% of current activities in this industry sector involve asbestos-containing material.

The main exposure to Australian workers arises from manufacture, processing and removal of friction products and gaskets. Home mechanics are also exposed during 'do-it-yourself' replacement of brake pads/shoes. The majority of workplace exposures were below the national exposure standard for chrysotile at the time of 1 f/mL. Despite the introduction of non-asbestos parts for the new vehicle fleet, import data indicated that the import of chrysotile products (mainly friction products and gaskets) was not decreasing. The assessment determined that best practice must be implemented to minimise occupational and public exposure, and to minimise environmental impact, over the remaining period(s) of use. A risk reduction strategy using all available and appropriate measures is required to ensure that the risks posed by chrysotile are continually reduced and eliminated wherever possible.

**General Public:** The major source of public exposure is from chrysotile dusts generated by vehicle braking, although the level of exposure is very low. Overseas and Australian studies showed very low air levels of chrysotile fibres at busy intersections (less than 0.01 f/mL) or freeway exits (0.5 particles/mL), generated by braking vehicles. At a location of 30 metres from the nearest traffic, air levels were below the limit of detection. There are no data on exposure of home mechanics during the changing of brake pads and shoes. However, the time-weighted exposure of home mechanics is unlikely to be higher than that of workers in automotive brake service centres.

### **Environmental exposure assessment**

When chrysotile is encapsulated in end use products such as brake linings and epoxy-resin adhesives, it is unlikely that fibres will be in a form where an environmental hazard is posed. Based on available data for Australia, it can be predicted that the manner of use of chrysotile (including release from driving and wastes from manufacturing) will result in a low exposure and hazard to the environment.

#### **(c) Key data reviews consulted and a brief description**

Key data reviews and national studies consulted are listed in the report that can be accessed at (<http://www.nicnas.gov.au/publications/CAR/PEC/PEC9/20031215-pec9c.pdf>) and these were:

Australia Bureau of Statistics (1995) Motor vehicle census Australia. Canberra, Australian Government Publishing Service.

Australian Bureau of Statistics (1997) Motor vehicles in Australia. Canberra, Australian Government Publishing Service.

EC (1997) European Commission DGIII, Environmental Resources Management. Recent assessments of the hazards and risks posed by asbestos and substitute fibres, and recent regulation of fibres worldwide. Oxford.

ECETOC (1996) Toxicology of man-made organic fibres. Technical report no. 69. European Centre for Ecotoxicology and Toxicology of Chemicals, Brussels, Belgium.

Federal Chamber of Automotive Industries (March 1997) VFACTS national vehicle retail sales report . FCAI, Melbourne.

Ferguson DA, Berry G, Jelihovsky T et al (1987) The Australian Mesothelioma Surveillance Program (1979-1985). Medical Journal of Australia. **147**: 166-172.

Hughes RJ (1977) Asbestos in Australia - its occurrence and resources. Australian Mineral Industry Quarterly, **30**(3): 119-127.

IARC (1987) IARC monographs on the evaluation of carcinogenic risks to humans: overall evaluations of carcinogenicity: an updating of IARC monographs volumes 1 to 42 (Supplement 7), International Agency for Research on Cancer, Lyon.

IARC (1988) Man-made mineral fibres and radon. IARC monographs on the evaluation of carcinogenic risks to humans :Vol 43. International Agency for Research on Cancer, Lyon.

IARC (1997) Silica, Some Silicates, Coal Dust and para - Aramid Fibrils. IARC monographs on the evaluation of carcinogenic risks to humans: Vol 68. International Agency for Research and Cancer, Lyon.

ILO (1989) Safety in the use of mineral and synthetic fibres: working document and report of the meeting of experts on safety in the use of mineral and synthetic fibres, Geneva, 17-25 April 1989. International Labour Organisation, Geneva.

IPCS (1986) Environmental Health Criteria 53: Asbestos and other natural mineral fibres. World Health Organisation, Geneva.

IPCS (1993) Environmental Health Criteria 151: Selected synthetic organic fibres. World Health Organisation, Geneva.

IPCS (1996) Health effects of interactions arising from tobacco use and exposure to chemical, physical or biological agents, Draft Monograph. World Health Organisation, Geneva.

IPCS (1998) Environmental Health Criteria 203: Chrysotile Asbestos. World Health Organisation, Geneva.

Leigh J, Hendrie L & Berry D (1998) The incidence of mesothelioma in Australia 1993 to 1995: Australian Mesothelioma Register Report, 1998. National Occupational Health and Safety Commission, Sydney.

Leigh J, Hull B & Davidson P (1997) Malignant mesothelioma in Australia (1945-1995). *Annals of Occupational Hygiene*, **41**(Supplement 1).

Newstead SV, Cameron MH & Le CM (1998) Vehicle crashworthiness ratings and crashworthiness by year of vehicle manufacture: Victoria and NSW crashes during 1987-96, Monash University Accident Research Centre, Report No. 128, [<http://www.general.monash.edu.au/muarc/rptsum/es128.htm>], 14/8/98.

Rogers AJ & Leigh J (1991) Chrysotile and mesothelioma: information paper 6, 26th meeting NOHSC, 4 December 1991.

Rogers AJ, Leigh J, Berry G et al. (1991) Relationship between lung asbestos fibre type and concentration and relative risk of mesothelioma: a case control study. *Cancer* **67**(7):1912-1921.

Rogers AJ, Leigh J, Berry G et al. (1994) Dose-response relationship between airborne and lung asbestos fibre type, length and concentration, and the relative risk of mesothelioma. *Ann Occ Hyg*, **38**, Supplement 1: 631-638.

Rogers AJ, Yeung P, Johnson A et al (1997) Trends in occupational groups and industries associated with Australian mesothelioma cases 1979-1995. *Ann Occ Hyg*, **41**, Supplement 1: 123-128.

Rogers AJ, Baker M & Conaty J (1997) Asbestiform minerals: worker exposure and risk assessment in some contaminated Australian mines. *Appl Occup Environ Hyg*, **12** (12): 867-871.

Rogers A & Leigh J (1993) Lung cancer risk from exposure to chrysotile (white asbestos) in Australia, NOHSC Meeting Agenda Item 23, March 1993.

### **III. Risk reduction and relevance to other states**

**(a) Estimates of the quantity of chemicals used, or imported/exported at the time of the regulatory action and, if possible information on ongoing trade**

The quantities of chrysotile imported into Australia currently are unknown. The amounts of chrysotile imported into Australia was approximately 1500 tonnes per year from 1990 to 1999. However with the severe restriction effective from 31 December 2003, the importation amounts are likely to be very small. The regulatory action was based on the findings of the assessment report.

**(b) Relevance to other States, i.e. those with similar conditions of use**

Many other States already have restrictions on the use of chrysotile. For example at the time of publication of the NICNAS assessment report, Austria, Denmark, France, Germany, Italy, Netherlands, Norway, Sweden, Switzerland, United Kingdom and the United States were all noted to have legislated some form of restriction (see Appendix 7, page 165 <http://www.nicnas.gov.au/publications/CAR/PEC/PEC9/20031215-pec9c.pdf>).

(c) **Comments on the typical use of the chemical within the notifying country, with comments on possible misuse (if appropriate)**

In Australia imports of raw chrysotile were used mainly in the manufacture of friction materials and compressed asbestos fibre (CAF) sheeting for gasket production with a small quantity being used in the manufacture of a 'non-sag' additive in an epoxy resin adhesive. All these uses, according to manufacturers, were being phased out. Brake linings and gaskets were found to be the main asbestos products imported for use in Australia, although most such products imported into Australia are asbestos-free.

## Annex II

### Supporting documentation for Australia's notification of chrysotile asbestos as a severely restricted chemical

1. Risk or hazard evaluation referenced in Section 2.3 of the notification form

<http://www.nicnas.gov.au/publications/CAR/PEC/PEC9/PEC9index.asp>

(link to PEC report - referenced in notification)

2. Relevant documentation for Section 2.4.1 referring to protecting human health

<http://www.nohsc.gov.au/PDF/Statistics/Meso2003.pdf>

(link to Mesothelioma 15th Report - referenced in notification)

<http://www.nohsc.gov.au/PDF/Drafts/chrysotile-pdp-mar-01.pdf>

(link to NOHSC public discussion paper - proposed prohibition on the use of Chrysotile Asbestos in Australia)

<http://www.nohsc.gov.au/PDF/Standards/Schedule2ReportPublicComment.pdf>

Proposed Prohibition on Uses of Chrysotile Asbestos - Report of Outcomes of the Public Comment Process July 2001

(read in conjunction with the NOHSC March 01 public discussion paper)

<http://www.nohsc.gov.au/PDF/Drafts/natlist-chrysotile-28june02.pdf>

NOHSC public comment paper - Proposed National List of Exemptions to the Prohibition on the Workplace Use of Chrysotile

<http://www.nohsc.gov.au/OHSLegalObligations/HazSubstancesAndDngGoods/ListofExemptions.doc>

National List of Exemptions from the Chrysotile Prohibition 2003

(approved list of exemptions)

Prohibition of Asbestos Amendments 2001 - Amendment to Schedule 2 of the National Model Regulations for the Control of Workplace Hazardous Substances

<http://www.nohsc.gov.au/OHSInformation/NOHSCPublications/fulltext/docs/h4/377.htm>

#### Other information

<http://www.cdc.gov/niosh/ipcsneng/neng0014.html>

(link to ICSC for Chrysotile – not referenced in notification although attached to notification sent)

The use of asbestos was severely restricted in Australia on 31 December 2003. The following documents were developed for the implementation of the regulatory activity.

Chrysotile Asbestos: Technical Assessment of Alternatives March 2001

<http://www.nohsc.gov.au/pdf/Drafts/chrysotile-ta-mar-01.pdf>

Chrysotile Asbestos: Health Assessment of Alternatives March 2001

<http://www.nohsc.gov.au/pdf/drafts/chrysotile-ha-mar-01.pdf>